Exhibit No.:	901
Issue(s):	Prudence of Environmental Upgrades; Commit Status of Generating Units; Off-System Sales
Witness:	Ezra D. Hausman, Ph.D.
Type of Exhibit:	Surrebuttal Testimony
Sponsoring Party:	Sierra Club
Case No.:	ER-2014-0258
Date Testimony Prepared:	February 6, 2015

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. ER-2014-0258

SURREBUTTAL TESTIMONY

OF

EZRA D. HAUSMAN, PH.D.

On Behalf of

SIERRA CLUB

** **Denotes Highly Confidential Information** **

PUBLIC

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1. BACKGROUND

Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS.

A. My name is Ezra D. Hausman, Ph.D. I am an independent consultant doing business as Ezra Hausman Consulting, operating from offices at 77 Kaposia Street, Auburndale, Massachusetts 02466.

Q. ARE YOU THE SAME EZRA HAUSMAN WHO PROVIDED DIRECT TESTIMONY IN THIS PROCEEDING?

A. Yes.

Q. ARE YOU PROVIDING ANY SCHEDULES WITH YOUR TESTIMONY?

A. Yes. I am sponsoring Highly Confidential Schedule EDH-4, which contains the attachment to Ameren's response to Sierra Club Data Request SC015.

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY IN THIS MATTER?

A. A number of issues that I raised in my direct testimony were addressed in the rebuttal testimony and workpapers of Ameren witnesses Jaime Haro, Matt Michels, Christopher Iselin, and Mark Peters. In some cases, I was able to lay to rest certain issues that I had raised in my direct testimony based on newly provided information. In other areas, I believe Ameren's witnesses have misconstrued the points raised in my direct testimony, or have addressed them in ways that do not resolve or negate the concerns I raised.

Specifically, I disagree with Ameren witness Matt Michels regarding the proper treatment of a CO_2 emissions price in performing PVRR analysis, and I continue to find the Company's treatment of this crucial planning assumption deficient. I also find that the Company should have analyzed the option of retiring a single Labadie unit, thereby reducing the required environmental upgrades that are included in the Company's rate increase request in this case, even if the Company's analysis found that retiring the entire Labadie plant was not economical. Finally, I would like to address the issue of accelerated depreciation for the Meramec unit raised by witness for public counsel Ted Robertson.

2. Resolved Issues

Q. ON WHAT TOPICS DO YOU FIND THAT NEWLY PROVIDED INFORMATION FROM AMEREN RESOLVES ISSUES RAISED IN YOUR DIRECT TESTIMONY?

A. I raised two points having to do with unit dispatch and off-system sales that have now been resolved. The primary one had to do with the dispatch status of **____ **.

Q. PLEASE BRIEFLY SUMMARIZE YOUR ORIGINAL POSITION ON THIS ISSUE, AND HOW NEWLY PROVIDED INFORMATION HAS CHANGED YOUR ANALYSIS AND RECOMMENDATIONS.

A. My original assertion was that Ameren had not provided any analysis in support of its practice of maintaining **________________________ **. In contrast, the Company did analyze the savings associated with removing must-run status for Meramec, and found that the benefits outweighed the costs of allowing some level of additional cycling. My clearly stated point was not that must-run status was necessarily uneconomic, but that there would be costs and benefits, and the Company had failed to provide any analysis or evidence weighing these.

However, in his rebuttal testimony, Mr. Haro stated that "In all of 2014, there was not a single instance when the average day-ahead LMP for a consecutive five day period would have warranted decommitting a **______________ ** generating unit."[1] This claim is largely supported by Mr. Haro's rebuttal workpapers, which show the hourly dispatch prices and running costs of each of the units in question. This confirms to my satisfaction that, at least for the test year, there would have been little to no savings from removing must-run status for these units, and the Company's designations were justified. As a result, I withdraw my recommendation that the Commission deny Ameren's request to

[1] Haro rebuttal testimony, p. 14 at lines 8-11.

recover $127 Million increase in annual revenue requirements associated with decreased net off-system sales revenue during the test year.

Q. DO YOU HAVE ANY FURTHER THOUGHTS AND/OR RECOMMENDATIONS ON THIS ISSUE?

A. The question of how to weigh costs and benefits of unit dispatch status is an important one, exemplified by the fact that Ameren is including the impact of such a change for Meramec in its current rate request. It is not sufficient to simply point out the costs of cycling each unit, as Mr. Iselin has done, without addressing the savings side of the equation. As Mr. Haro has shown, this can be rectified by a simple demonstration in cases where an individual unit is clearly economic most hours of the year.

I would also like to note that this entire issue could have been avoided had the Company simply provided its justification for assigning must-run status to certain resources in its initial filing. As noted above and by various Ameren witnesses, departures from economic dispatch can provide savings for ratepayers in certain circumstances; however, such a determination should be made in the full light of day. Ameren prepared this analysis for the Meramec plant in advance of filing this case and shared it with the parties in response to discovery; the Company should have provided the same information and analysis with respect to its other generating units.

As fuel, emissions, variable operations and maintenance (O&M) costs, and the market environment for Ameren's generating units change in the future—including as they undergo additional retrofits to comply with environmental regulations—it will be important for Ameren to review this operational decision on an ongoing basis to ensure that the best interests of ratepayers are served.

I therefore recommend that the Commission direct Ameren to provide such an analysis justifying the dispatch status for all must-run units in all future rate cases.

Q. WHAT IS THE OTHER ISSUE RELATED TO DISPATCH STATUS AND OFF-SYSTEM SALES THAT YOU NOW CONSIDER RESOLVED?

A. In my direct testimony, I was unable to reconcile the change in off-system sales reported by the Company in response to Sierra Club Data Request SC008(c) with the workpapers and exhibits provided by the Company.[2] On Page 2 of his rebuttal testimony, Mr. Peters pointed out that I had erred in selecting the model run for use in my calculations, and that this accounted for the difference. I have since re-done the analysis using the correct file, and the discrepancy has been resolved.

Q. MR. PETERS ALSO CLAIMS THAT YOU ERRONEOUSLY FAULT THE COMPANY FOR NOT REPORTING AVOIDED O&M COSTS IN RESPONSE TO SIERRA CLUB DATA REQUEST SC008, WHEN THIS DATA REQUEST REFERRED ONLY TO AVOIDED FUEL COSTS. DO YOU AGREE?

A. No. It is true that the *data request* referred only to avoided fuel costs, but this is because in Mr. Peters's direct testimony, he refers only to avoided fuel costs and lost off-system sales revenue.[3] My point was that in comparing costs to savings, all savings should be considered—including avoided O&M costs, which had not been mentioned by Mr. Peters either in his direct testimony or in response to the Sierra Club data request (which I agree did not request O&M costs).

As noted above, this does not change my conclusion regarding **______________________________ ______________________ **; however, it does change the calculation of the savings associated with Meramec's dispatch status. Avoided O&M should be considered in this and any future analysis of the costs and benefits of changing any unit's dispatch status.

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[2] Hausman direct testimony, p. 15 at lines 11-15.
[3] Peters direct testimony, p. 6 at line 19.

3. Scenario Analysis

Q. TURNING TO THE COMPANY'S MODELING OF ITS RESOURCE PLANS, WHAT WAS AMEREN WITNESS MATT MICHELS'S CRITICISM OF YOUR DIRECT TESTIMONY IN THIS AREA?

A. Mr. Michels notes that I find the Company's 2014 Integrated Resource Plan (IRP), which supports the current rate case, to be deficient in ways that exaggerate the economic benefits of continued investment in and operation of the Company's coal fleet. The primary area of disagreement has to do with the Company's modeling of greenhouse gas emissions regulations.

I had criticized the Company for modeling only a 15% probability of any carbon price at all during the planning horizon, while the Company and I appear to agree that some sort of carbon emissions restrictions during this time period is all but inevitable. In contrast, Mr. Michels claims that "Ameren Missouri has appropriately accounted for regulation of carbon dioxide emissions in its IRP analysis."[4] Mr. Michels claims that the Company did model a high probability of carbon restrictions, but that because the recently proposed Clean Power Plan (CPP) does not include an explicit price or a specific trading mechanism, it was appropriate to discount the likelihood of a carbon price and to omit it from much of the Company's modeling effort. As I explain below, I do not believe this approach is appropriate or reasonable.

Q. MR. MICHELS STATES THAT YOUR TESTIMONY AND HIS ARE LARGELY IN AGREEMENT THAT THE CURRENTLY PROPOSED REGULATORY SCHEME FOR GREENHOUSE GAS EMISSIONS FROM THE POWER SECTOR INVOLVES AN "INDIRECT" COST.[5] DO YOU AGREE?

A. Yes. While the CPP allows for trading mechanisms, such as the existing CO_2 emissions markets in California and the northeastern U.S., it does not mandate such a mechanism. If there is no explicit tax or

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[4] Michels rebuttal testimony, p. 4 at lines 18-19.
[5] *Ibid*, pp. 9-10.

trading mechanism involved, it is fair to say that this represents an "indirect" cost. Other words to describe this are an "effective price of carbon"[6] or a "shadow price".

Q. THEN WHAT IS YOUR DISAGREEMENT WITH MR. MICHELS AND WITH AMEREN'S APPROACH IN THIS REGARD?

A. While Ameren developed a number of scenarios that Mr. Michels claims represent the Company's expectations regarding carbon regulations, it then modeled them in its PVRR analysis without imposing any financial penalty for carbon emissions. This amounts to modeling no policy at all: the PVRR analysis has neither an explicit limitation on emissions nor a price. However, it does include the financial *costs* of actions that avoid emissions, such as coal plant retirements, new nuclear plants, and increased reliance on renewables. This approach fundamentally biases the analysis towards resource plans that have no emissions limitations.

The issue of indirect pricing of carbon is discussed in detail in the referenced Synapse report[7] and is well understood by economists. Because of the nature of the planning and modeling process, the Synapse report explicitly recommends using carbon prices for analytical purposes, even if they are "effective" or "notional" prices instead of explicitly representing trading prices or a tax. Similarly, EPA applies the IPM model to model the economic impact of the CPP, and the IPM model produces a "shadow price" on carbon emissions.[8] Even without an explicit price in the policy, there is an effective price because there is a limitation on emissions, so the right to emit CO_2 becomes a "good" for which there is a market value.

Mr. Michels may claim that "Ameren Missouri has assumed an 85% probability that there will indeed be regulation of carbon dioxide emissions through indirect means."[9] However, in its PVRR analysis, the Company has effectively modeled only a 15% chance of any regulation at all.

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[6] This is the term used in the Synapse CO_2 price forecast (Schedule EDH-2).
[7] Provided with my direct testimony as Schedule EDH-2.
[8] http://www.epa.gov/airmarkets/programs/ipm/cleanpowerplan.html
[9] Michels rebuttal testimony, p. 8 at lines 11-13.

Q. MR. MICHELS ASSERTS THAT THE COMPANY CORRECTLY INTERPRETS THE SYNAPSE REPORT ON CARBON PRICING, CALLING IT "INEXPLICABLE" THAT YOU FAULT THE COMPANY FOR ONLY PRICING THE PROBABILITY OF A "DIRECT" PRICING MECHANISM. DO YOU AGREE?

A. No. The Synapse report specifically refers to indirect regulation as representing an "effective price of carbon." According to the Synapse report (p.6),

> For any such non-market policy there is an "effective" price: a market price that—if instituted as an allowance or tax—would result in the identical emission reduction as the non-market policy. An effective price may be used internally within a firm, government agency, or other entity to represent the effects of command and control policies for the purpose of improved decision making.

The report goes on to clarify that this applies specifically to the Clean Power Plan (p.6):

> The U.S. Environmental Protection Agency's (EPA's) proposed carbon pollution standard for new sources of electric generation is a non-market-based policy that would represent an effective price.

This gets to the issue that I touched on earlier: for modeling purposes, and for purposes of comparing the PVRR of alternative plans under any sort of carbon regulation, it is imperative to monetize the impact of the greenhouse gas emissions rule. Otherwise, it has an effective price of zero, no matter what actions the Company models, and compliant plans will misleadingly appear to be unduly expensive relative to noncompliant plans.

A proper application of the Synapse carbon price recommendations would be to apply the range of prices provided over 100% of the probability space. The Company could then do an apples-to-apples comparison, and could report explicitly what part of the PVRR is attributable to the carbon cost. As it is, this information is unavailable to the Commission and to other intervenors.

Q. IN SIERRA CLUB DATA REQUEST SC012, AMEREN WAS ASKED TO DESCRIBE "HOW THESE 'INDIRECT' REGULATORY MECHANISMS ARE ACCOUNTED FOR IN THE COMPANY'S PVRR ANALYSIS FOR ITS IRP." WHAT WAS THE COMPANY'S RESPONSE?

A. The response to Sierra Club Data Request SC012, prepared by Lead Analyst Rex Jenkins, described how different regulatory scenarios would affect market prices of electricity in the Company's modeling process. Specifically, Mr. Jenkins cites the different levels of coal plant retirements associated with different regulatory scenarios, and concludes:

> The impact of different levels of coal plant retirements is reflected in the power market prices from each scenario...The price scenarios developed for the IRP explicitly reflect the retirement of specific units in the Eastern Interconnect based on a relative ranking of unit efficiency. These market prices are used to assess revenues and costs for all off system sales and purchases modeled in alternative resource plans. These costs and revenues flow through our financial modeling and are reflected in all revenue requirement calculations.

Q. IS MR. JENKINS'S RESPONSE CONSISTENT WITH YOUR CLAIM THAT THE COMPANY IS PRODUCING A BIASED ANALYSIS WITH RESPECT TO REGULATION OF CO_2 EMISSIONS?

A. Yes. As Mr. Jenkins describes it, coal retirements driven by carbon policy would increase electricity prices throughout the Eastern Interconnect, including the prices at which Ameren transacts purchases and sales with other entities. However, because the Company does not model an emissions price, the production cost for Ameren would be unaffected in the model. The paradoxical effect would be that Ameren's carbon-intensive resources do better under carbon regulations because the modeling assumes that Ameren's production costs are somehow unaffected by regulations that are imposing costs on the industry as a whole. This is exactly the kind of bias that would be expected from attempting to model a carbon policy in a financial analysis without representing any price on emissions.

Q. HAVE YOU ANALYZED HOW AMEREN'S RESULTS MIGHT BE DIFFERENT HAD THE COMPANY MODELED A HIGHER PROBABILITY OF A CARBON PRICE?

A. Yes. While I cannot redo the Company's PVRR analysis entirely, I can modify the Company's IRP workpapers by changing the probabilities associated with each scenario, and determine how the ranking of plans would be different had the carbon-price scenarios been weighted differently. Mr. Michels notes that two of the Company's cases, Plan M and Plan G, "differ only in that Plan M reflects Labadie retired and replaced, and Plan G reflects continued operation of the plant."[10] According to the Company's analysis, the present value revenue requirement for Plan M (Labadie retired) is $3.6 Billion greater than that of Plan G (Labadie retrofit and continued operation.)

However, if only the scenarios with a carbon price are considered—taking the Company's carbon price assumptions as described in Chapter 2 of its 2014 IRP at face value—a very different picture emerges. If I include all of the carbon price scenarios (the bottom five "branches" of the Company's "probability tree" in Chapter 9 of the IRP) with the relative weightings given by Ameren, the advantage of "Plan G" over "Plan M" shrinks from $3.6 Billion to under $500 Million. If I consider only the Company's "High" carbon price scenario, the relative PVRR advantage flips, and "Plan M" shows a net *savings* of almost $1 Billion over "Plan G."

Q. WHAT IS YOUR RECOMMENDATION FOR THE COMMISSION ON THIS ISSUE?

A. Given that the deficiencies in the Company's PVRR analysis have not been resolved, I recommend that the Commission deny the part of Ameren's request for rate recovery of depreciation of the Labadie ESPs **__________ ** as well as any return on this investment, unless or until the Company resolves these deficiencies and presents the Commission with an adequate justification for the prudence of these expenditures including an unbiased treatment of carbon emissions costs.

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[10] *Ibid*, p. 12 at lines 4-6.

Q. IN AMEREN'S SCENARIO ANALYSIS, DID THE COMPANY MODEL THE OPTION OF RETIRING EITHER LABADIE UNIT 1 OR UNIT 2 INDIVIDUALLY, RATHER THAN THE WHOLE PLANT? IF NOT, WHY NOT?

A. No. According to Ameren's response to Sierra Club Data Request SC018, Ameren did not model such a scenario. According to the data response, such an analysis "would not add value to the analysis, especially after seeing the results from the early retirement plan with significant additional costs to customers."[11]

Q. DO YOU AGREE WITH THIS LOGIC?

A. No. According to Ameren witness Michels, "The costs accounted for in our retirement analysis include capital and operating costs for new combined cycle gas generation to ensure the Company has sufficient resources to meet load and reserve margin requirements, costs for investment in transmission system upgrades to ensure system reliability with those units removed from the grid, and opportunity costs in the form of lost margins from sales of energy."[12] These costs do not scale directly with the number of units retired. It is entirely possible, for example, that a single unit could be retired without requiring any investment in replacement generation or transmission upgrades, even if the entire plant could not.

Q. WHAT IS YOUR RECOMMENDATION FOR THE COMMISSION ON THIS ISSUE?

A. I recommend that, prior to approving rate recovery of or return on depreciation of the Labadie ESPs, the Company be directed to perform and provide an analysis of the option of retiring either Labadie Unit 1 or Labadie Unit 2 individually.

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[11] Response to Sierra Club Data Request SC018(a)(i).
[12] Rebuttal testimony of Matt Michels, p. 13 at lines 7-11.

4. DEPRECIATION OF MERAMEC

Q. WHAT IS PUBLIC COUNSEL WITNESS TED ROBERTSON'S RECOMMENDATION REGARDING THE COMPANY'S REQUEST FOR ACCELERATED DEPRECIATION ON THE MERAMEC PLANT?

A. Mr. Robertson contends that this issue, and the underlying analysis, is unchanged since the Company's 2010 rate case, and the Commission's earlier target date of 2027 for depreciation purposes should stand.

Q. DO YOU AGREE THAT THE ISSUE IS ESSENTIALLY UNCHANGED SINCE 2010?

A. No. In the intervening years, the regulatory environment for Ameren's coal plants has evolved significantly, and the required investments for continuing to run while meeting various emissions restrictions and other environmental constraints has become clearer. The presumed retirement date of 2022 is also significantly closer, leading to inherently greater certainty in planning. In addition, according to Ameren witness Kevin DeGraw, the plant has experienced serious equipment failures and possible safety issues that have raised doubts about the plant's long-term viability without major investments of capital,[13] which the Company does not anticipate as far as I can tell. Many of these issues were presented to the Board of Ameren Missouri on June 26, 2014, at which the decision to retire Meramec in 2022 was ratified.[14] I have included a highly confidential one-page presentation from that meeting, produced in response to Sierra Club Data Request SC015, as HC Schedule EDH-4

Finally, the Company has now developed a more detailed plan for the retirement of Meramec, including converting Units 1 and 2 to burn natural gas in 2015, and retiring all units in 2022.[15]

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[13] Direct testimony of Kevin DeGraw, p. 3 at lines 9-11.

[14] Ibid, p. 5 at lines 6-16.

[15] Ameren's planned expenditures for the retirement of Meramec, along with a brief description of steps the Company is taking in preparation for retirement, were provided in response to Sierra Club Data Request SC016. The plan for converting Meramec Units 1 and 2 to gas burning is part of the preferred option described in Ameren's 2014 IRP.

Q. WHAT IS YOUR RECOMMENDATION FOR THE COMMISSION ON THIS ISSUE?

A. I recommend that the Commission grant Ameren's request for a depreciation schedule based on a final retirement date of 2022. However, in response to Public Counsel's concerns, the Commission should expressly make this approval of accelerated depreciation contingent on the Company's commitment to take all appropriate steps towards final closure of the plant no later than December 31, 2022. In so doing, the Commission would put the burden on Ameren to follow through with retirement of the plant by that date, or to make a further filing with the Commission if it seeks to delay retirement of the plant to a later date.

5. Revised Recommendations

Q. WHAT ARE YOUR REVISED RECOMMENDATIONS FOR THIS COMMISSION ON THE ISSUES RAISED IN YOUR DIRECT TESTIMONY?

A. Given that the deficiencies in the Company's PVRR analysis have not been resolved, I recommend that the Commission deny Ameren's request for rate recovery of depreciation of the Labadie ESPs ** __________ **, as well as any return on this investment, unless or until the Company resolves these deficiencies and presents the Commission with an adequate justification for the prudence of these expenditures, including an unbiased treatment of carbon emissions costs and an evaluation of the economics of retiring each Labadie unit individually.

I withdraw my earlier recommendation that the Commission deny Ameren's request to recover $127 Million increase in annual revenue requirements associated with decreased off-system sales revenue, based on the Company's lately produced analysis demonstrating that cycling ** ____________________ ____________________________________ **. However, this entire issue could have been avoided had the Company simply provided its justification for assigning must-run status to certain resources its initial filing. As noted above and by various Ameren witnesses, departures from economic dispatch can provide savings for ratepayers in certain circumstances; however, such a determination should be made in the full light of day.

Finally, as in my direct testimony, I recommend that the Company be put on notice that any future rate requests will be contingent on the Company producing a least-cost, Clean Power Plan-compliant resource plan demonstrating that the Company's resource investments are consistent with likely federal carbon regulation, quantifying the costs and benefits of these investments to ratepayers under the assumption that the rules, as currently proposed by the U.S. EPA, become law.

Q DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

A. Yes.

SCHEDULE EDH-4

IS DEEMED

HIGHLY CONFIDENTIAL

IN ITS ENTIRETY

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company, d/b/a Ameren Missouri's Tariff to Increase its Annual Revenues for Electric Service	)))	Case No. ER-2014-0258

County of Middlesex)
) ss
State of Massachusetts)

AFFIDAVIT OF EZRA D. HAUSMAN

Ezra D. Hausman, of lawful age, on his oath states: that he has participated in the preparation of this surrebuttal testimony in question and answer form consisting of 13 pages to be given as Surrebuttal Testimony in the above-named case; that the answers were given by him and that he has knowledge of the matters set forth in such answers; and that such matters are true to the best of his knowledge and belief.

Ezra D. Hausman

In witness whereof I have hereunto subscribed by name and affixed my official seal this 6th day of February, 2015.